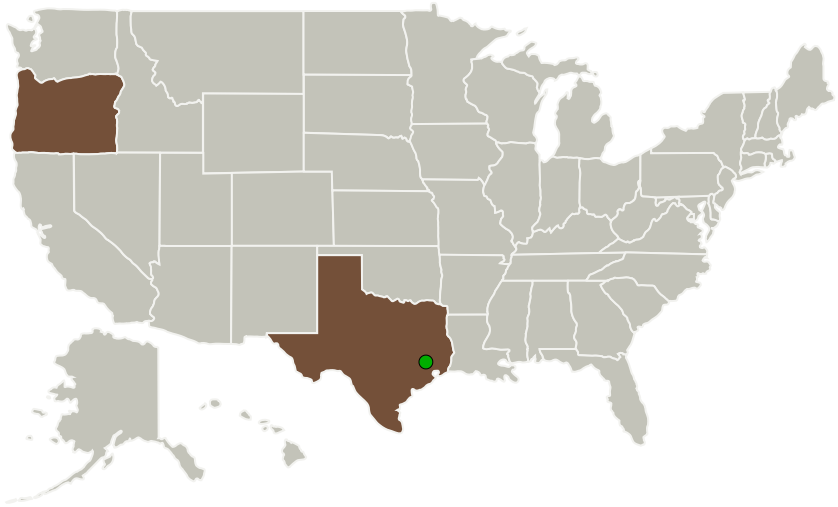
Advanced Air Evaporation System with Reusable Wicks for Water Recovery, Phase I

Completed Technology Project (2011 - 2011)

Project Introduction

A microgravity-compatible Advanced Air Evaporation System (AAES) is proposed for recovering nearly 100% of water from highly contaminated wastewater without concern for precipitation of organic and inorganic solids. The AAES incorporates reusable wicks, and heat exchange and thermoelectric heat pump technologies which reduce Equivalent System Mass (ESM) by lowering consumable supplies and energy use when compared to previous air evaporation system designs. AAES will help meet the challenge of improving water loop closure in future water recycling systems as missions venture beyond Low-Earth Orbit (LEO), where higher fractional recovery of water from wastewater resources is needed. Highly contaminated wastewater streams such as urine, hygiene water, and RO brines are major wastewater resource streams for the AAES. The Phase I project will focus on development and characterization of reusable wicks. The Phase II will incorporate heat exchange and thermoelectric heat pump technology into a working prototype whose performance will be thoroughly characterized and delivered to NASA for independent testing. These efforts will increase water recovery, reduce logistics, increase reliability, and lower ESM for water recycling during future space missions beyond LEO.

Primary U.S. Work Locations and Key Partners



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Organizations Performing Work	Role	Type	Location
UMPQUA Research Company	Lead Organization	Industry	Myrtle Creek, Oregon
Johnson Space Center(JSC)	Supporting Organization	NASA Center	Houston, Texas

Primary U.S. Work Locations	
Oregon	Texas

Project Transitions

February 2011: Project Start

September 2011: Closed out

Closeout Documentation:

- Final Summary Chart*(https://techport.nasa.gov/file/137952)*

Organizational Responsibility

Responsible Mission Directorate:

Space Technology Mission Directorate (STMD)

Lead Organization:

UMPQUA Research Company

Responsible Program:

Small Business Innovation Research/Small Business Tech Transfer

Project Management

Program Director:

Jason L Kessler

Program Manager:

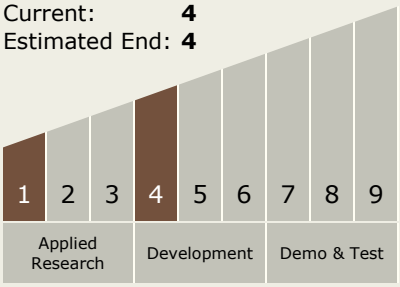
Carlos Torrez

Principal Investigator:

James R Akse

Technology Maturity (TRL)

Start: **1**
Current: **4**
Estimated End: **4**



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Technology Areas

Primary:

- TX06 Human Health, Life Support, and Habitation Systems
  - TX06.1 Environmental Control & Life Support Systems (ECLSS) and Habitation Systems
    - TX06.1.2 Water Recovery and Management

Target Destinations

The Sun, Earth, The Moon, Mars, Others Inside the Solar System, Outside the Solar System